



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,890	02/09/2004	Eugene A. Fitzgerald	ASC-049C1	8754

*51414 7590 11/28/2006

GOODWIN PROCTER LLP
PATENT ADMINISTRATOR
EXCHANGE PLACE
BOSTON, MA 02109-2881

EXAMINER

LE, DUNG ANH

ART UNIT PAPER NUMBER

2818

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,890

Applicant(s)

FITZGERALD, EUGENE A.

Examiner

DUNG A. LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE dated 2/17/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-88 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-38, 40- 41, 44-47, 53-54, 65-66, 77-79, 85-86 is/are rejected.
- 7) ☒ Claim(s) 39, 42, 43, 48-52, 55-64, 67-76, 80-84, 87 and 88 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/17/06; 8/21/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on 2/17/2006 and 8/21/2006 has/have been considered and made of record. The references cited on the PTOL 1449 form have been considered.

Specification

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claim 78 is objected to because of the following informalities:

In claim 78, line 1, change the term "a strained layer" to -- the strained layer -- in order to particularly define the subject matter which Applicants regard as the invention.

Claim Rejections

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 32-37 and 78 are rejected under 35 USC 102 (b) as being anticipated by Enquist (6500694 B1).

Regarding claim 32, Enquist teaches a method (especially refer to figs 1-4 and refer to related texts, also col 15, lines 48-55) comprising:

providing a substrate 10; and

providing a first strained layer 12 disposed above the substrate, the first strained layer having an average surface roughness of no more than approximately 2 nm (col 6, lines 40-45).

Regarding claim 33, wherein the substrate 11 comprises Si.

Regarding claim 34, wherein the first strained layer 12 comprises Si or Ge (col 6, line 36).

Regarding claim 35, wherein the first strained layer 12 (comprises Si as claimed material) is tensilely strained.

Regarding claim 36, wherein the first strained layer 12 (comprises Si as claimed material) is compressively strained.

Regarding claim 37, wherein the first strained layer 12 has a surface roughness of less than approximately 0.77 nm (col 6, lines 40-45).

Regarding claim 78, wherein the step of providing a strained layer comprises wafer bonding (fig. 3 and refer to related texts).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 53 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Enquist in view of the following remark.

Enquist teaches the claimed invention as applied to claim 32 except for providing a second strained layer disposed above the first strained layer as cited in current claim 53

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a second strained layer disposed above the first strained layer,

since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Claims 32, 38, 40-41, 44-47, 54, 65, 77, 79, 85-86 are rejected under 35 USC 102 (b) as being anticipated by Matsushita et al. (5 705 421).

Regarding claim 32, Matsushita et al. teaches a method (especially refer to fig. 14 and see to related texts) comprising:

providing a substrate 1; and

providing a first strained layer 5 disposed above the substrate, the first strained layer having an average surface roughness of no more than approximately 2 nm (col 6, lines 38-41).

Regarding claim 38, further comprising providing an insulator layer 3 disposed beneath the first strained layer.

Regarding claim 40, wherein the step of providing an insulator layer comprises wafer bonding (col 6, lines 50-55).

Regarding claim 41, further comprising providing a relaxed layer 4 disposed beneath the strained layer 5.

Regarding claim 44, where in the step of providing a relaxed layer 4 comprises epitaxial growth (col 6, line 25).

Regarding claim 45, wherein the step or providing a relaxed layer comprises wafer bonding (col 6, lines 50-55).

Regarding claim 46, the relaxed layer 4 comprises SiGe (col 6, line 25).

Regarding claim 47, the substrate 1 comprises a graded-composition SiGe layer.

Regarding claim 54, further comprising providing a spacer layer 6 disposed above the first strained layer 5.

Regarding claim 66, further comprising providing a gate stack disposed above the first strained layer (col 7, lines 45-50).

Regarding claim 77, wherein the step of providing a strained layer comprises epitaxial growth (col 6, line 35).

Regarding claim 65, wherein the first strained layer 5 has an average surface roughness of less than approximately 0.77 nm (col 7, lines 40-45).

Regarding claim 79, further comprising providing a gate stack disposed above the first strained layer 5 (col 7, lines 45-50).

Regarding claim 85, further comprising providing a relaxed layer 4 disposed beneath the strained layer 5.

Regarding claim 86, wherein the relaxed layer 4 comprises SiGe.

Reasons for Indication of Allowable Subject Matter

Claims 39, 42, 48-52, 55-64, 67-76, 80-84, 87-88 ---- are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Matsushita et al. (U.S. Patent No. 5705421) and Enquist (U.S. Patent No. 6500694) and Background of the invention, taken individually or in combination, do not teach the claimed invention having **(Regarding claim 39)** wherein the insulator layer comprises SiO₂; **(Regarding claim 42)** the relaxed layer has an average surface roughness of less than approximately 2nm ;**(Regarding claim 48)** wherein the relaxed layer has an average surface roughness of less than approximately 0.77 nm; **(Regarding claim 49)** further comprising providing a regrown SiGe layer on the relaxed layer; **(Regarding claim 55)** wherein the spacer layer 6 has a thickness of less than approximately 5 nm (**Regarding claim 56)** wherein the first strained layer comprises Ge and the spacer layer consists essentially of Si; **(Regarding claim 57)** further comprising providing a second strained layer disposed above the spacer layer; **(Regarding claim 59)** wherein the spacer layer comprises Ge; **(Regarding claim 60)**


further comprising providing a gate stack disposed above the spacer layer; **(Regarding claim 67)** further comprising providing device isolation regions and **(Regarding claims 70 and 80)** further comprising providing metal silicide regions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, M. Smith can be reached on (571) 272-1907. The central fax phone numbers for the organization where this application or proceeding is assigned are (571)272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE 
Primary Examiner
Art Unit 2818